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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/796,963 | 03/11/2004 | Nobutoshi Arai | 0020-5237P | 4006 |
| 2292 | 7590 | 07/17/2006 | EXAMINER | |
| BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747 | | | SEFER, AHMED N | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2826 | |

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|-----------------------------|--|
| Office Action Summary | Application No. 10/796,963 | Applicant(s) ARAI ET AL. | |
| | Examiner A. Sefer | Art Unit 2826 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 9-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 21-33 and 35-44 is/are rejected.
- 7) ☒ Claim(s) 34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed April 26, 2006 has been entered and claims 35-44 have been added.

Specification

2. Claim 21 is objected to because of the following informalities: The recitation calling for “**the a** memory function body comprising” should read “**a** memory function body comprising”.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5, 8, 24, 26-32 and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshii et al. (“Yoshii”) US PG-Pub 2003/0132432.

Yoshii discloses (fig. 45 and par. 0531) a memory function body comprising: a first conductor 4051 or silicon substrate (**as in claim 8**) and a second conductor 4058; a medium 4052/4057 or silicon oxide (**as in claim 8**) that is formed between the first conductor and the second conductor and made of a first material; at least one particle 4053 that is formed in the medium and made of a third material; and a cover (unnumbered), formed within the medium and set away from each surface of the medium, that covers the entire surface of the at least one

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particle and is made of a second material (par. 0531), wherein the second material being a material capable of functioning as a barrier against passage of electric charges, and the third material being a material capable of retaining electric charges.

As for claim 2, Yoshii discloses (pars. 0258-0260 and 0501) the first material and the second material being different insulators, and the third material is a conductor.

As for claims 3 and 4, Yoshii discloses the second material being a material obtained by making the third material insulative obtained by oxidizing or nitriding the third material (as in claim 4).

As for claim 5, Yoshii discloses (pars. 0258-0260) the first material being a silicon oxide or a silicon nitride, the second material is a semiconductor oxide, and the third material is a semiconductor.

Regarding claim 24, Yoshii discloses (par. 0577) third material being made of one of tungsten and gold.

Regarding claim 26, Yoshii discloses (pars. 0258-0260 and 0501) the second material being silicon nitride and the third material being silicon.

Regarding claim 27, Yoshii discloses (par. 0530) the medium having a thickness within the range recited in the claim.

Regarding claim 28, Yoshii discloses (par. 0530) said particle having a diameter within the range recited in the claim.

Regarding claim 29, Yoshii discloses (pars. 0258-0260 and 0501) first, second and third material being different.

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Regarding claim 30, Yoshii's disclosure (pars. 0144 and 0245 and abstract) could be utilized in a DRAM having a capacitor comprising the memory function body as recited above.

Regarding claim 31 Yoshii discloses an outer surface of the cover being a boundary between of the cover and the medium.

Regarding claim 32, Yoshii discloses said cover functioning as a barrier to prevent electric charges from passing to the medium.

Regarding claim 35, Yoshii discloses said cover covering the entire surface of the at least one particle being completely embedded within the medium.

5. Claims 21-23 and 37, 39 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshii.

Yoshii discloses (figs. 44-46 and par. 0531) a memory device or a memory circuit having memory devices (as in claim 22) or Electronic equipment including a semiconductor device including a memory circuit having memory devices (as in claim 23) including a field-effect type transistor that employs a memory function body comprising a first conductor 4051 and a second conductor 4058/4069; a medium 4052/4057 that is formed between the first conductor and the second conductor and made of a first material; at least one particle 4053 that is formed in the medium and made of a third material; and a cover (unnumbered), formed within the medium and set away from each surface of the medium, that covers the entire of the at least one particle and is made of a second material, wherein the second material being a material capable of functioning as a barrier against passage of electric charges, and the third material being capable of retaining function to retain electric charges.

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Regarding claims 37, 39 and 41, Yoshii discloses said cover covering the entire surface of the at least one particle being completely embedded within the medium.

6. Claim 33 and 43 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshii.

Yoshii discloses (figs. 44-46 and par. 0531) a memory function body comprising: a lower conductor 4051 and an upper conductor 4058; a medium 4052/4057 that is formed between the lower conductor and the upper conductor and made of a first material; a plurality of particles 4053/4056 that are located in different depths within the medium set away from each of all surfaces of the medium and made of a third material, and covers, formed within the medium and set away from each surface of the medium, that cover the entire surface of each of the particles and are made of a second material, the second material being a material capable of functioning as a barrier against passage of electric charges, and the third material being a material that capable of retaining electric charges.

Regarding claim 43, Yoshii discloses said cover covering the entire surface of the at least one particle being completely embedded within the medium.

Note that the terms ‘that functions’ or ‘has a function’ recited in the claims constitute functional language. Intended use and other types of functional language terms must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In re Casey, 152 USPQ 235 (CCPA 1967); see also In re Otto, 136 USPQ 458, 459 (CCPA 1963).

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7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 6, 7 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshii.

Yoshii discloses (pars. 0576 and 0577) the device structure as recited in the claim including the second material being aluminum oxide but does not specifically disclose the third material being aluminum.

However Yoshii discloses that the third material could be made of other metal materials which would include aluminum or silver (as in claim 25).

Therefore, one having an ordinary skill in the art at the time the invention was made would be motivated to substitute the third material with aluminum and cover the third material with Yoshii's aluminum oxide since that would simplify manufacturing process. It would have been obvious to substitute the third material with silver and cover the third material with silver oxide (as in claim 25) since that would save material and reduce cost.

9. Claims 36, 38, 40, 42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshii.

Yoshii discloses the device structure as recited in the claim but does not disclose a single medium.

However, it is noted that the 35 U.S.C. § 103 rejection based on the integration of multiple pieces into one piece or using multiple pieces in replacing a single piece has been previously decided by the courts.

In Howard v. Detroit Stove Works 150 U.S. 164 (1893), the Court held, "it involves no invention to cast in one piece an article which has formerly been cast in two pieces and put together...."

In In re Larson 144 USPQ 347 (CCPA 1965), the term "integral" did not define over a multi-piece structure secured as a single unit. More importantly, the court went further and stated, "we are inclined to agree with the solicitor that the use of a one-piece construction instead of the [multi-piece] structure disclosed in Tuttle et al. would be merely a matter of obvious engineering choice" (bracketed material added). The court cited In re Fridolph for support.

Response to Arguments

10. Applicant's arguments filed April 26, 2006 have been fully considered but they are not persuasive.

Applicants argue that Yoshii fails to teach each and every claimed element. Specifically, Applicants argue that Yoshii's cover for microparticle 4053 is in contact with an upper surface of an insulating film 4052 and a cover for microparticle 4056 is in contact with a lower surface of an insulating film 4057.

11. In response, it is pointed that Yoshii's insulating layers 4052 and 4057 are made up of the same material. Therefore, no matter how actually layers 4052 and 4057 are made, it does read into Applicants medium and that the cover formed within the medium is set away from each surface (top surface of layer 4057 and bottom surface of layer 4052) of the medium.

Allowable Subject Matter

12. Claim 34 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to disclose a memory function body comprising particles closer an upper conductor being thicker than the covers for the particles closer to lower conductor. The above limitation(s) in combination with other claim limitations are not taught or fairly suggested by the prior art nor would it be obvious to modify the references of record so as to manufacture a thin film transistor device of the instant application.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

~~NATHAN J. FLYNN~~
~~SUPERVISORY PATENT EXAMINER~~
~~TECHNOLOGY CENTER 2800~~

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANS

July 3, 2006